

### REMARKS

Claims 1-3, 5-17, 19-21, 23 and 24 are pending in this application. Claims 1, 9, 12, 15 and 21 have been amended. It is respectfully submitted that no new matter has been added.

#### Rejections under 35 U.S.C § 102:

Claims 1, 2, 5, 6, 9, 10, 12, 13, 21 and 23 stand rejected under 35 U.S.C § 102 (e) as being anticipated by Chu (US2004/0192058).

Amended claims 1 and 9 recite, *inter alia*, treating the photoresist pattern comprising an ArF photoresist material with plasma generated by exciting a fluorine-free carbon-containing gas. Amended claim 12 recites, *inter alia*, forming a polymer layer comprising carbon on the surface of the photoresist pattern comprising an ArF photoresist material using plasma generated by exciting a fluorine-free carbon-containing gas. Amended claim 21 recites, *inter alia*, forming a polymer layer using plasma generated by exciting a fluorine-free carbon-containing gas, the polymer layer comprising carbon on the surface of the photoresist pattern comprising an ArF photoresist material. The present application states that "prior to a main etching process using fluorocarbon plasma, plasma pretreatment is performed on the photoresist pattern to prevent the deformation of the photoresist pattern formed of the ArF photoresist material." See paragraph [0035] of the present application.

Applicants respectfully submit that Chu does not disclose the above-claimed features. For example, Chu does not disclose treating the photoresist pattern comprising an ArF photoresist material with plasma generated by exciting a fluorine-free carbon-containing gas. In contrast, Chu is completely silent on this feature.

Therefore, Applicants respectfully submit that claims 1, 9, 12 and 21 are not anticipated by Chu.

Claims 2, 5 and 6 depend from claim 1. Claim 10 depends from claim 9. Claims 13 depends from claim 12. Claim 23 depends from claim 21. These dependent claims include the elements of base independent claims and therefore are not anticipated by the cited reference for at least the reasons given above.

Therefore, Applicants respectfully request that the Examiner withdraw the rejections of claims 1, 2, 5, 6, 9, 10, 12, 13, 21 and 23 under 35 U.S.C § 102 (e) and claims 1, 2, 5, 6, 9, 10, 12, 13, 21 and 23 are in condition for allowance.

**Rejections under 35 U.S.C § 103:**

Claims 1, 2, 5-10, 12, 13, 21 and 23 stand rejected under 35 U.S.C § 103 (a) as unpatentable over Lindley (U.S. Patent 6,326,307) in view of Meyer (U.S. Patent 4,504,574).

Amended claims 1 and 9 recite, *inter alia*, treating the photoresist pattern comprising an ArF photoresist material with plasma generated by exciting a fluorine-free carbon-containing gas. Amended claim 12 recites, *inter alia*, forming a polymer layer comprising carbon on the surface of the photoresist pattern comprising an ArF photoresist material using plasma generated by exciting a fluorine-free carbon-containing gas.

Amended claim 21 recites, *inter alia*, forming a polymer layer using plasma generated by exciting a fluorine-free carbon-containing gas, the polymer layer comprising carbon on the surface of the photoresist pattern comprising an ArF photoresist material. Applicants respectfully submit that neither Lindley, Meyer, nor any combination thereof teaches or suggests the above-claimed features.

The Office Action acknowledges that "Lindley and Meyer fail to disclose that the photoresist pattern was formed by an ArF light source." See page 6 of the Office Action. This follows that Lindley and Meyer fail to disclose treating the photoresist pattern comprising an ArF photoresist material.

Thus, claims 1, 9, 12 and 21 are not rendered obvious by Lindley in view of Meyer. As claims 2, 5-8, 10, 13 and 23 depend from claims 1, 9, 12 and 21, respectively, they are also not rendered obvious by Lindley in view of Meyer for at least the above regions.

Based on the arguments above, reconsideration and withdrawal of the rejection of claims 1, 2, 5-10, 12, 13, 21 and 23 under 35 U.S.C. § 103 (a) is respectfully requested.

Claims 3, 11, 14 and 24 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Lindley and Meyer in view of Ko (U.S. Patent Application 2003/0129816).

As discussed above, Lindley and Meyer do not disclose the photoresist pattern comprising an ArF light source, as essentially recited in claims 1, 9, 12 and 21.

Ko does not cure the deficiency of Lindley and Meyer with regard to the above feature. Accordingly, independent claims 1, 9, 12 and 21 are patentable over Lindley and Meyer in view of Ko. Claims 3, 11, 14 and 24 depend from claims 1, 9, 12 and 21, respectively. Thus, these dependent claims are also patentable for at least the same reasons given for the respective base claims.

Therefore, Applicants respectfully request that the Examiner withdraw the rejections of claims 3, 11, 14 and 24 under 35 U.S.C. 103(a) and claims 3, 11, 14 and 24 are in condition for allowance.

Claims 15-17, 19 and 20 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Lindley in view of Meyer and further in view of Ma (U.S. Patent 6,830,877).

Amended claim 15 recites, *inter alia*, treating the photoresist pattern comprising an ArF photoresist material with plasma generated by exciting a fluorine-free carbon-containing gas. As discussed above, neither Lindley, Meyer, nor any combination thereof teaches or suggests the above feature.

Ma does not cure the deficiency of Lindley and Gabriel with regard to the above feature. The Examiner states that "Ma discloses a method for forming via and contact holes with a photoresist comprising imaging a photoresist material using an argon fluoride laser source since a 193 nm source is required". See page 6 of the Office Action. Applicants respectfully disagree. In contrast, Ma discloses deep UV photoresist such as PMMA or polybutane sulfone. Further, Ma does not disclose treating the photoresist pattern with plasma generated by exciting a fluorine-free carbon-containing gas. In contrast, Ma discloses "the deep UV photoresist layer is pre-treated by a curing process with UV radiation". See the Abstract of Ma. However, the UV irradiation process involves the shrinking of photoresist patterns and requires additional equipment. See paragraph [0011] of the present application.

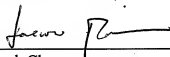
Accordingly, claim 15 is patentable over Lindley and Meyer in view of Ma.

Claims 16, 17, 19 and 20 depend from claim 15. Thus, claims 16, 17, 19 and 20 are also patentable for at least the same reasons given for claim 15.

Therefore, Applicants respectfully request that the Examiner withdraw the rejections of claims 15-17, 19 and 20 under 35 U.S.C. 103(a) and claims 15-17, 19 and 20 are in condition for allowance.

For the foregoing reasons, the present application is believed to be in condition for allowance. The Examiner's early and favorable action is respectfully requested. The Examiner is invited to contact the undersigned if he has any questions or comments in this matter.

Respectfully submitted,

  
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